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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
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| 10/508,736 | 05/19/2005 | Masaaki Takeda | 57694US004 | 7951 |

32692 7590 01/28/2008
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| EXAMINER |
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WATKINS III, WILLIAM P

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| ART UNIT | PAPER NUMBER |
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1794

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| NOTIFICATION DATE | DELIVERY MODE |
|-------------------|---------------|

01/28/2008

ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

LegalUSDocketing@mmm.com
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| | | | |
|------------------------------|---|--------------------------------------|--|
| Office Action Summary | Application No. 10/508,736 | Applicant(s) TAKEDA ET AL. | |
| | Examiner William P. Watkins III | Art Unit 1794 | |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 30 October 2007.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1 and 6-10 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1 and 6-10 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 21 September 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 1 and 6-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nakamura et al. (U.S. 6,335,076) in view of Toriumi et al. (U.S. 6,590,070).

Nakamura et al. teaches a thermo-adhesive sheet that is used to bond circuit board layers together. The adhesive sheet has through via that have low melting solder in them (abstract, col. 5, lines 5-25 and col. 6, lines 5-20). Toriumi et al. teaches an thermo-adhesive with a methacrylic copolymer that is useful in electronic devices. The instant invention claims the use of a thermo-adhesive with a methacrylic copolymer. It would have been obvious to one of ordinary skill in the art to have used a methacrylic thermo-adhesive as the adhesive of Nakamura et al. in order to form a good bond with the circuit pattern

because of the teaching of Toriumi et al. Selection of pressure and temperature conditions for bonding is taken as being within the ordinary skill of the art absent unexpected results.

3. Applicant's arguments filed 30 October 2007 have been fully considered but they are not persuasive.

Applicant argues that Nakamura et al. does not teach an adhesive sheet that forms a molten bond with the solder in a hole in the adhesive sheet. Applicant argues that a hole is drilled in the adhesive sheet after it is joined to the circuit board and therefore there can be no molten bond with the solder. The examiner disagrees. Figure 17 shows an adhesive sheet (element 13) with a hole with a solder bump (element 14). As noted in col. 7, lines 40-65 of Nakamura et al., the adhesive sheet is temporarily joined to the circuit board and then after the solder bump is formed in the via of the adhesive sheet, there is a consolidation of the adhesive sheet and adjacent circuit boards by heat and pressure. It is taught in col. 6, lines 25-40 that the temperature may be chosen such that the solder flows and joins the adjacent circuit layers. It is explicitly taught that the temperature of the solder can be selected to be compatible with the circuit board substrates. If

both the solder and thermo-adhesive flow in order to join the adjacent circuit boards, there will be a molten bond between the solder and the thermo-adhesive.

Applicant further argues that Toriumi et al. teaches a thermo-adhesive, but does not teach use of solder in via holes. The examiner does not rely on Toriumi et al. for the teaching of solder in a via, but instead Toriumi et al. is relied upon for the teaching of a specific thermo-adhesive used for joining in electrical applications that has the advantage of lower level e-beam curing. It would have been obvious to have used the adhesive of Toriumi et al. as the adhesive in the adhesive sheets in the circuit laminate of Nakamura et al. in order to obtain the curing advantages taught by Toriumi et al. Toriumi et al. teaches a pressing temperature of 80 to 300 degrees centigrade and a pressing pressure of 1 to 1,000 newtons per centimeter squared (col. 6, lines 40-50). Selection of less than 120 degrees centigrade from the range taught by Toriumi et al. would have been an obvious matter, as would selection of a solder that would flow at this temperature in order to melt and consolidate both the adhesive and solder as taught by Nakamura et al. as noted above.

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4. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

5. Any inquiry concerning this communication or earlier communications from the examiner should be directed to William P. Watkins III whose telephone number is 571-272-1503. The examiner works an increased flex time schedule, but can normally be reached Monday through Friday, 11:30 A.M. through 8:00 P.M. Eastern Time. The examiner returns all calls within one business day unless an extended absence is noted on his voice mail greeting.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Rena Dye can be reached on 571-272-3186. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

William P. Watkins III

WW/ww

January 21, 2008

**WILLIAM P. WATKINS III
PRIMARY EXAMINER**